tended to the northward, forming a barometric trough which extended from the Rio Grande River to Manitoba, while a secondary disturbance apparently passed far to the north. The more clearly defined low area remained central over Colorado and disappeared without causing any change in the meteorological conditions of the regions to the east of the mountain slope. The barometric pressure remained low until the 7th, but not enough energy was developed to cause a motion of translation.

IV.—This area of low pressure was at no time central within the limits of the stations of observation. It was observed on the morning of the 8th central in the lower Saint Lawrence valley, and it passed with uniform velocity to the eastward, apparently increasing in force.

V.—As in the case of area of low pressure number iii, this area also developed in the southern plateau region, and, after moving slowly to the northeast, remained central in the Rocky Mountain region until it finally disappeared on the 10th, forty-eight hours after it was first located. When the centre reached its most northerly latitude a secondary disturbance was formed to the north of Montana, but neither of these depressions could be traced to the east of the central valleys. Number v disappeared on the 10th, when the telegraphic reports indicated that there was a slight westerly movement of the surface atmosphere in that region.

VI.—This low area developed sixteen hours after the disappearance of the area of low pressure traced as number v, only one telegraphic report separating the two areas, and they probably form a single depression. The barometer continued low over the entire Rocky Mountain region during the greater part of the month, and the tracks of the centres of these slight disturbances have been located and traced with a view of indicating in a graphic manner the prevailing areas of low pressure in the Rocky Mountain districts for the month. Number vi remained almost stationary from the 11th until the 16th, and during a greater part of this period it was a well-defined disturbance which threatened the populated districts, but it passed northeastward over Minnesota and did not affect the weather conditions of the Lake region.

VII.—This storm was observed at midnight of the 15th moving eastward to the north of Quebec. It passed eastward with considerable energy, causing high winds in the Maritime Provinces and brisk winds, with showers, in New England on the 16th. The centre of disturbance is only approximately given for each of the tri-daily reports of the 16th. It passed over the north Atlantic, attended by dangerous gales, on the 17th.

VIII.—This slight depression was central south of Arizona on the 19th. It apparently moved in a northwesterly direction, following the mountain range of southern California. The telegraphic reports are not of sufficient number to enable one to satisfactorily trace the barometric disturbances which pass over the plateau regions. Generally during the past three months, numerous areas of low pressure have apparently originated over the southern plateau regions, and, after passing northward in rear of an area of high pressure, they pass to the east of the mountain range and influence the weather conditions of the Atlantic.

IX.—This is the only depression of the month observed as first central in the region north of Montana. Although traced to the eastward north of the Lake region this storm did not develope sufficient energy to cause marked changes in the weather of the United States. It moved eastward with almost uniform velocity until it reached longitude 78° W., where it apparently retreated or remained nearly stationary, while its area became more extended. When this area of low pressure was central north of the Lake region general rains occurred southward to the Ohio Valley, and fresh to brisk westerly winds were reported from the lake stations.

X.—This area of low pressure probably originated over Nevada, but is first noted as central in Montana on the morning of the 26th. It moved to the northeast from Montana and passed beyond the stations of observation during the 27th, it being last observed far to the north of Minnesota.

NORTH ATLANTIC STORMS DURING JUNE, 1887.

[*Pressure in inches and millimetres; wind-force by Beaufort scale.*]

The paths of the depressions that have appeared over the north Atlantic Ocean during the month are determined, approximately, from international simultaneous observations furnished by captains of ocean steamships and sailing vessels; abstracts of ships' logs and other data collected by the Signal Service agencies at the ports of New York, Boston, and Philadelphia; reports received through the co-operation of the "New York Herald Weather Service;" and from other miscellaneous data received at this office up to July 21, 1887.

Thirteen depressions are traced, of which one traversed the ocean from coast to coast; two appeared to the northward of the West Indies; two passed eastward over Newfoundland; one apparently originated southwest of the British Isles and moved northward, and eight developed over mid-ocean. The general direction of movement of these depressions was east-northeast to the eastward of the thirtieth meridian, while to the westward of that longitude their course of direction was diversified.

With the exception of rather strong summer gales to the westward of the twenty-fifth meridian during the second decade of the month, the general character of the weather over the north Atlantic Ocean was settled and seasonable. From the 12th to the 16th strong north to east winds were reported in the Gulf Stream south of the fortieth parallel; from the 14th to the 17th, inclusive, the severest weather of the month prevailed to the eastward and southward of Newfoundland; on the 24th moderate to strong gales were encountered over mid-ocean, and on the 29th fresh gales were experienced to the southward of the Banks. The lowest barometer reading reported in the trans-Atlantic routes was 29.30 (744.2), on the 15th, in N. 42° 53′, W. 57° 31′. During the second and third decades of the month the barometer was almost continuously high over the eastern portion of the ocean south of the fifty-fifth parallel; to the southward of the fortieth parallel high pressure prevailed, except off the coast of the United States from the 10th to the 16th, and in the vicinity of the Azores from the 22d to the 25th, inclusive.

In June, 1886, fourteen depressions were traced, of which one was traced across the ocean; five were continuations of areas of low pressure traced on the North American continent; four originated over the ocean east of the thirty-sixth meridian, and four developed between the coast of North America and the forty-second meridian. Two very violent and destructive cyclones moved from the Carribean Sea into the Gulf of Mexico; the remaining depressions traced were, as a rule, of slight depth, and their passage was unaccompanied by atmospheric disturbances of unusual violence.

As compared with the corresponding month of previous years, the depressions which appeared during June, 1887, were possessed of the average summer strength, and while no tropical storms appeared over the Caribbean Sea their absence during this month is not unusual.

The following are brief descriptions of the depressions traced:

1.—The presence of this storm off the southwest extremity of Ireland was shown by reports of the 1st; by the 2d the centre of disturbance had moved north, after which it disappeared beyond the region of observation. This depression had baro-

metric pressure ranging to about 29.60 (751.8), and occasional gales of but moderate strength.

2.—This depression appeared over mid-ocean on the 1st, with central pressure about 29.60 (751.8), and moderate to fresh gales, and moved slowly north of east to the southwestward of the British Isles by the 3d, after which it was drawn northward by depression number 3.

3.—This storm was central on the 1st in about N. 58°, W. 36°, whence it moved slowly northeast to the thirtieth meridian, after which it passed beyond the region of observation.

4.—This depression appeared over mid-ocean on the 3d, with pressure ranging to about 29.40 (746.7), and, circling northwest, united with depression number 5 on the 4th.

5.—This depression is first charted in N. 53°, W. 41°, under date of the 4th, whence it had apparently advanced from the westward; moving east-northeast this storm disappeared to the northward of the British Isles after the 7th. While the course of this storm was too far to the northward to be severely felt in the trans-Atlantic routes, it possessed considerable energy and had barometric pressure ranging to about 29.40 (746.7) on the 4th.

6.—This depression appeared northeast of the Banks of Newfoundland on the 8th, with central pressure about 29.50 (749.3), and, moving northward, passed beyond the region of observation after the 9th.

7.—This depression advanced over the southeastern portion of Newfoundland during the 9th, and, moving rapidly east-northeast, disappeared to the northward of the British Isles during the 12th, with a moderate display of energy throughout.

8.—This depression moved slowly southward off the middle Atlantic coast of the United States during the 10th and 11th, accompanied by moderate to fresh gales, and thence passed northeast along the Gulf Stream to mid-ocean by the 15th, where it disappeared. The storm had greatest strength during the 15th when pressure 29.30 (744.2) was reported.

The following special reports have been made relative to this depression:

Capt. J. H. Bennett, of the s. s. "Edith Godden," reports: "12th, in N, 38° 10′, W. 74° 15′; 1 p. m., barometer 29.98 (761.5), wind nne., force 6, moderate northerly sea and heavy easterly swell, weather fine; 5. p. m., barometer 29.90 (759.4), wind nne., force 6, heavy nne. sea., very heavy e. by n. swell; 10 p. m., barometer 29.86 (758.4), wind n. by e., force 7, heavy n. by e. sea, very heavy ene. swell, weather threatening. 13th, 3 a. m., barometer 29.72 (754.9), wind n., force 9, very heavy n. sea and ne. by e. swell, steering south, hauled ship's head to the wsw.; 9 a. m., in N. 35° 04′, W. 75° 10′, barometer 29.78 (756.4), wind n. by w., force 7, less sea and losing the heavy ne. swell, sky covered with scud travelling very fast from n. by w.; noon, less wind and sea, sky clearing."

Capt. H. Campbell, of the s. s. "Saint Ronans," reports a strong gale, commencing from the s. at 6 p. m. of the 14th (in N. 47° 22′, W. 37° 01′, at noon) and ending from the nnw. at noon of the 15th, in N. 46° 08′, W. 41° 23′. The wind veered to sw. and w. in a. m. of the 15th, and was accompanied throughout by very heavy ssw. seas. Capt. Hugh Young, of the s. s. "Devonia," reports a fresh gale on the 14th and 15th; wind backed from sw. to s.; lowest barometer, 29.30 (744.2), at 4 a. m. of the 15th, in N. 42° 53′, W. 57° 31′. Capt. James Scott, of the s. s. "Buenos Ayrean," reports a fresh gale on the 15th; wind veered from ssw. to nw. at 6.30 p. m.; lowest barometer, 29.50 (749.3), at 6 p. m., in N. 53° 26′, W. 30° 06′. Capt. W. Stamper, of the s. s. "Worcester," reports a strong gale on the 15th; wind veered from s. to n.; lowest barometer, 29.38 (746.2), at 6 p. m., in N. 49° 00′, W. 32° 00′.

9.—This depression first appeared on the 14th in the subtropical region north of the West Indies, and, circling slowly east of north, disappeared after the 16th. The depression was of slight depth, but, in conjunction with depression number 8, occasioned very unsettled weather off the middle and south Atlantic coasts of the United States from the 12th to the 16th, as is shown by the following report: Capt. Frank Stevens, of the s. s. "Manhattan," reports strong ne. to nne. winds from the 12th to the 16th, during passage from Havana to Winter Quarter Light-ship; also had very heavy confused seas and had to haul in out of the Gulf Stream to get smoother water, as the sea was very high and the vessel shipped much water. He further reports this as being the roughest passage he has experienced in seventeen months.

10.—This depression passed east-northeast over Newfoundland during the 17th, and disappeared over mid-ocean in about N. 51° after the 19th. This storm displayed considerable energy prior to the 19th, and was accompanied by fresh to strong gales and heavy rain.

The following special reports refer to this depression:

Capt. A. J. A. Mann, of the s. s. "State of Pennsylvania," reports: "17th, at about 2 h. 50 m., experienced the beginning of an unusually strong summer gale from the southward, barometer being then 29.92 (760.0) and falling, and position, N. 50° 12′, W. 42° 00′; wind freshened to whole gale by 8 h. 50 m., and by 11 h. it blew very strong, with fierce squalls, rain, and heavy sea; 14 h., gale began to abate, but still very squally, with heavy, constant rain, and black weather; 17 h. 30 m., barometer at lowest, 29.44 (747.8), wind and sea abating, position, N. 49° 25′, W. 44° 15′; after this the gale continued to moderate and the barometer commenced to rise."

Capt. W. Rea, of the s. s. "Bassano," reports a fresh gale on the 16th and 17th; wind veered from sse. to wsw.; lowest barometer, 29.73 (755.1), at 8 p. m. of the 17th, in N. 39° 44′, W. 53° 49′. Capt. James Scott, of the s. s. "Buenos Ayrean," reports a strong gale on the 17th and 18th; wind veered from s. to w.; lowest barometer, 29.60 (751.8), at 2 p. m. of the 18th, in N. 49° 30′, W. 42° 35′. Mr. H. H. Herbert, observer on the s. s. "Worcester," Capt. W. Stamper, commanding, reports: "17th, in N. 47° 20′, W. 39° 00, at noon, hard sw. gale, with torrents of rain and heavy sw. sea till 8 a. m. of the 18th, in N. 45° 30′, W. 41° 00, when the barometer read 29.57 (751.1). Wind continued sw., following the gale, with thick fog.

11.—This depression moved southeast over mid-ocean during the 21st and 22d, without evidence of marked energy, and disappeared to the northward of the Azores.

12.—This depression appeared over the ocean to the northward of the Azores on the 24th, after which it apparently dispersed. Although short-lived, this storm possessed considerable strength and had barometric pressure ranging to about 29.50 (749.3).

The following reports have been rendered relative to this depression: Capt. C. A. Murray, of the s. s. "Albano," reports a moderate gale on the 23d and 24th; wind veered from n. to se.; lowest barometer, 29.73 (755.1), at noon of the 24th, in N. 48° 9′, W. 32° 30′. The sea broke over the ship during this storm, causing considerable damage. Capt. R. Potter, of the s. s. "Santiago," reports a strong gale on the 24th and 25th; wind veered from nne. to e.; lowest barometer, 29.54 (750.3), at 6 p. m. of the 24th, in N. 46° 30′, W. 36° 30′. The gale was attended by high seas and blew strongest from nne. from 4 p. m. to midnight of the 24th.

13.—This depression passed northeast from the Banks of Newfoundland during the 28th, and disappeared north of the fifty-fifth parallel after the 29th, with moderate to fresh gales, rain, and pressure ranging to about 29.70 (754.4).

OCEAN ICE.

On chart i are also exhibited the limits within which icebergs and field ice were reported during June, 1887. These limits are determined from reports furnished by shipmasters, and from data collected by the Signal Service agencies.

The easternmost ice was passed on the 20th, in N. 43° 22′, W. 39° 19′, by the s. s. "Nessmore," and the southernmost ice reported was observed on the 15th, in N. 40° 40′, W. 48° 34′, from the s. s. "City of Montreal."

Ice was most frequently encountered during the month from the coast of Newfoundland, between Saint John's and Cape Race, south-southeast to the forty-first parallel; from the New-

foundland coast, south of the forty-ninth parallel, eastward to the forty-fourth meridian, ice was encountered in large quantities throughout the month.

As compared with ice reported during May, 1887, there has been a total disappearance of field ice and icebergs to the westward of the fifty-fifth meridian; the chart for May showing considerable ice in the vicinity of Cape Breton and south of Newfoundland. The extreme limits of ice are about seven degrees further east and about one degree further north than in May, and there has been a decided increase in the quantity of ice reported to the eastward of Newfoundland, which fact is due to vessels following a more northerly route.

As compared with June, 1886, the eastern and southern limits are about the same, while the quantities of ice reported off the southern coast of Newfoundland and northward to Labrador in 1886 do not appear on the chart for June, 1887.

As compared with the corresponding month of previous years the southward movement of ice massed to the northward of Newfoundland and off the coast of Labrador has been greatly delayed, and advices fail to show that vessels passed through the Straits of Belle Isle, although this route has usually been available early in June.

The following table shows the southern and eastern limits of the region within which ice was reported for June during the last five years:

Southern limit.			Eastern limit.		
Month.	Lat. N.	Lon. W.	Month.	Lat. N.	Lon. W.
	° ′	° ′		° ′	° ′
June, 1883	40 28	51 45	June, 1883	48 14	42 43
June, 1884	40 42	47 49	June, 1884	44 00	45 23
June, 1885	39 38	48 12	June, 1885	45 14	41 12
June, 1886	40 30	53 00	June, 1886	49 15	40 00
June, 1887	40 40	48 34	June, 1887	43 22	39 19

Icebergs and field ice were reported as follows:

Date.	Vessels.	Position. Lat. N.	Position. Lon. W.	Remarks.
		° ′	° ′	
1	S. S. Indian Prince	42 24	51 06	Two large bergs.
	S. S. Hermann	43 12	49 02	One berg.
2	S. S. Alaska	42 57	49 30	One medium berg.
	S. S. La Normandie	42 53	49 47	Do.
	S. S. Nova Scotian	Between St. John's and Cape Race.		Several large bergs.
	S. S. Dakota	42 57	49 30	One berg.
	S. S. Dorset	47 20	48 20	Three bergs.
	Bk. Jupiter	43 20	45 30	One berg.
3	S. S. Elder	43 46	45 10	Do.
		42 44	49 51	Do.
	S. S. Dorset	46 30	51 05	Do.
	S. S. Brooklyn City	45 44	47 04	One medium berg.
	S. S. Procida	42 38	49 07	One berg.
		42 39	48 58	Five bergs; one very large.
3, 4, 5	Bk. Adolph	42 45	47 54	One large and four small.
		43 20	49 42	One large berg.
		43 24	50 02	Do.
4	S. S. State of Indiana	43 05	49 10	Do.
	S. S. Amalfi	42 06	50 24	Do.
		42 13	48 59	One medium berg.
	S. S. Norseman	42 56	49 00	One berg.
	S. S. Hekla	44 00	46 00	One berg and small ice.
	S. S. Aller	42 00	50 21	One large berg.
		42 09	49 05	Do [broken ice.
6	S. S. Hekla	43 50	46 00	One berg and extensive fields of
	S. S. Scythia	43 46	46 48	One berg.
	S. S. Lessing	43 39	46 51	Do.
	S. S. Gratitude	46 00	54 to 52	Several bergs.
	S. S. Jupiter	43 50	45 30	One medium berg.
7	S. S. Scythia	42 24	49 41	One berg.
		42 16	50 23	Do.
	S. S. Trave	45 20	48 40	Do.
	S. S. Florida	42 00	49 00	Two large bergs.
8	S. S. Ivigtut	46 00	51 00	One very large berg.
9	S. S. Auchoria	44 49	47 44	One large berg.
10	S. S. Servia	42 28	48 05	One small berg.
	S. S. Ripon City	46 23	48 35	Three large bergs.
	Bk. Sodium	48 35 to Cape Race.	51 40	Numerous bergs.
		46 27	48 24	One large berg and pieces.
11	S. S. State of Nebraska	46 18	48 36	One very large berg.
		45 26	51 00	One medium berg.
12	Bk. Sodium	46 20	52 30	One large berg.
	S. S. Adriatic	42 54	46 53	Do.
	S. S. Grecian	9 miles east of Cape Race.		Two large bergs.
		36 miles east of Cape Race.		Three large bergs.
		47 12	51 25	Two large bergs and ice.
		47 45	49 50	One large berg.

Icebergs and field ice—Continued.

Date.	Vessel.	Position. Lat. N.	Position. Lon. W.	Remarks.
		° ′	° ′	
13	S. S. W. A. Scholten	41 12	48 29	One berg.
	S. S. Kate Fawcett	45 36	50 14	One small berg.
13, 14	S. S. Venetian	48 00	48 30	Several bergs.
		49 00	44 30	Do.
	Bk. Sodium	Cape Race 30 miles n. by w. ½ w.		Two large bergs.
	S. S. Sarnia	30 miles sw. Cape Race.		Three bergs.
	S. S. Gellert	41 04	49 59	One berg.
		41 21	48 24	One large berg.
	S. S. Anchoria	45 55	44 27	Do.
14	S. S. Bengore Head	54° e., 80 miles n. from Cape Race, to Cape Race.		Two large and several smaller bergs.
	S. S. Saale	42 57	49 31	One berg.
	S. S. Monte Rosa	46 00	52 50	Two very large bergs.
	S. S. Peruvian	48 08	50 30	One large berg.
15	S. S. Main	47 00	44 00	Large bergs.
		48 00	45 00	
	S. S. City of Montreal	40 40	48 34	One large berg.
	S. S. Bengore Head	Off Cape Race.		Three bergs.
		Cape Race bearing n. 54° e., 80 miles.		Two large bergs.
	S. S. Eidor	46 16	48 25	One large berg.
	S. S. City of Chester	40 56	47 57	One small berg.
16	S. S. Devonia	44 20	48 30	One large berg.
	S. S. Saint Romans	44 10	48 13	Do.
	S. S. Main	46 28	47 57	One berg.
		46 04	48 35	Do.
	S. S. La Bourgogne	44 32	49 10	Do.
	S. S. Samatian	Off Cape Race.		Eight bergs and loose ice.
	S. S. Austrian	47 38	50 35	One large berg.
	Bk. Francis Herbert	42 57	49 28	One medium berg.
	S. S. Jan Breydel	43 36	44 20	One large berg.
17	S. S. Austrian	46 42	52 26	Do.
		47 23	51 13	Do.
18	S. S. Palestine	42 40	50 08	Three large pieces of ice.
	S. S. Trave	46 03	48 49	One medium berg.
19	S. S. Buenos Ayrean	48 00 to Cape Race.	49 20	Several bergs and small pieces.
	S. S. De Ruyter	47 02	45 04	One large berg.
	S. S. Trave	47 08	44 53	One medium berg.
20	S. S. De Ruyter	46 13	48 38	One large berg.
	S. S. State of Alabama	47 08	44 48	Do.
	S. S. Jersey City	46 10	47 50	Do.
		47 10	45 40	Do.
	S. S. Hay Green	30 miles south of the Banks.		Two enormous bergs.
	S. S. Nessmore	43 22	39 19	One piece of ice.
21	S. S. State of Alabama	45 57	48 29	One large berg.
22	S. S. City of Chester	41 00	47 00	Small bergs.
		41 30	48 00	
		47 34	50 00	Cape Race, five bergs.
23	S. S. La Gascogne	47 12	51 15	One medium berg.
		47 10	51 20	One large berg.
		46 48	52 40	One medium berg.
	S. S. Crystal	44 45	48 50	Do.
25	S. S. Roman	44 25	48 28	Three small bergs and pieces.
28	.....do	5 miles off Cape Race.		Five bergs.
	S. S. Mineola	43 30	50 05	One medium berg.
29	S. S. Egypt	45 49	48 55	One berg low in water.
		45 58	48 18	One small berg.
	S. S. Mineola	43 24	46 59	One large berg.
	Bk. Jupiter	44 44	48 36	Do.
30	S. S. Circassia	46 11	48 42	One medium berg.
		45 48	49 35	Do.
	S. S. Scandinavian	47 10	45 15	One large berg.
		45 52	48 36	One berg.
		45 50	49 08	Do.

FOG.

The following reports show that fog was encountered in the vicinity of the Banks of Newfoundland on fourteen dates; to the westward of the sixtieth meridian on seventeen dates, and to the eastward of the Banks on fifteen dates. In each of the instances in which fog was observed in the vicinity of the Banks, save on the 25th, 26th, and 27th, the reporting vessel was located in the southern or eastern quadrant of an area of low barometric pressure, and on the excepted dates the winds were variable and marked ranges in temperature were shown in that region. To the westward of the sixtieth meridian fog developed within high barometer areas which succeeded the passage of areas of low pressure, and during the middle portion of the month originated to the northward of low barometer areas which occupied the ocean south of the fortieth parallel. As regards fog reported in the trans-Atlantic routes east of the Banks of Newfoundland, its presence was generally noted in the southeast quadrant of a storm-area or along the northern or northwestern margin of an area of high barometric pressure. In all cases the prevalence of fog was shown to be due to abnormal atmospheric conditions attending

the approach or passage to the eastward of cyclonic areas, whereby masses of air exhibiting large ranges in temperature were drawn into the localities where the fog banks were encountered.

The following are the limits of fog-areas on the north Atlantic Ocean during June, 1887, as reported by shipmasters:

Date.	Vessel.	Entered.			Cleared.		
		Lat. N.	Lon. W.	Time.	Lat. N.	Lon. W.	Time.
		° ′	° ′		° ′	° ′	
1	S. S. Scythia	51 48	8 00		51 46	8 15	
1	S. S. British Prince	40 59	47 22		40 51	47 42	
2	S. S. La Normandie	42 50	50 05		42 49	52 10	
2	S. S. Canada	41 06	65 30		40 45	68 00	
2	S. S. Ems	41 00	65 55		40 30	71 30	
2–3	S. S. Amicitia	Boston.				70 49	
3	S. S. Canada	40 54	69 00		40 26	70 00	
3	S. S. Umbria	41 58	62 00		41 37	64 00	
8	S. S. Stockholm City	42 35	65 50		Till port.		
8	S. S. Pennland	40 26	70 40		40 26	72 00	
8	S. S. Edith Godden	38 41	74 23		Sandy Hook.		
8	S. S. State of Indiana	Off Shinnecock to Sandy Hook.					
8	S. S. La Normandie	42 45	57 30		42 42	61 05	
8–9	Brig. Arcot	43 28	69 12		44 12	67 41	
9	S. S. Hekla	41 00	66 30		40 30	71 00	
9	S. S. City of Richmond	41 03	65 45		41 01	67 19	
9	S. S. Scythia	42 27	64 15		42 30	66 15	
9	S. S. Trave	41 09	66 14		40 42	70 44	
9	S. S. Ems	40 20	64 35		40 03	68 20	
9	S. S. Scandinavian	42 20	54 02	8 p. m	42 25	53 22	
9–10	Schr. C. B Church	40 08	72 47		41 00	71 30	
11	S. S. Aurania	49 50	20 45		50 40	16 15	At intervals.
12	S. S. Saint Ronans	49 27	24 33		42 20	25 00	
12	S. S. Letimbro	35 00	10 38		35 56	10 50	
13	S. S. Wyoming	41 50	60 00		41 44	60 40	
13	S. S. Sarnia	46 32	52 50		48 06	47 51	
13	S. S. Rotterdam	48 31	16 51		Lasted one hour.		
13	S. S. Vaderland	39 39	64 05		39 42	63 41	
14	S. S. Saale	43 40	46 20		42 37	51 26	
14	S. S. Rotterdam	49 06	13 32		Lasted two hours.		
14–15	S. S. Ems	49 30	17 45		49 34	17 20	
16	S. S. Sarmatian	St. Pierre Island; detained three hours.					
17	S. S. Trave	43 34	57 03		43 56	55 36	
17	S. S. Elbe	42 44	45 55		42 41	46 13	
17	S. S. Saint Ronans	44 03	50 27		43 37	53 00	
17	S. S. Main	44 59	52 40		44 00	56 21	
17	S. S. Devonia	43 27	49 46		43 49	52 42	
17–18	S. S. Palestine	43 55	48 00		42 46	50 10	
18	S. S. Elbe	42 40	46 04		42 08	50 04	
18	S. S. Taormina	41 55	46 00		41 00	49 15	
18	S. S. Worcester	44 30	42 00		43 33	45 05	
18–19	S. S. Pennland	40 28	72 40		40 09	70 11	
18–20	S. S. Saint Ronans	40 26	73 51		41 15	62 54	
18–20	S. S. Geiser	47 12	37 55		43 32	43 11	
18–21	S. S. Buffalo	44 00	40 15		40 58	55 45	At intervals.
18–24	S. S. Denmark	43 29	39 42		40 41	69 48	do.

Limits of fog areas—Continued.

Date.	Vessel.	Entered.			Cleared.		
		Lat. N.	Lon. W.	Time.	Lat. N.	Lon. W.	Time.
		° ′	° ′		° ′	° ′	
19	S. S. Trave	47 10 / 48 40	44 43 / 39 00		47 50	42 21	
19	S. S. De Ruyter	47 47	42 08		48 48	38 07	
19	S. S. City of Richmond	40 30	72 00		47 34	43 38	
19–20	S. S. Amicitia	40 10	70 05		40 37	68 58	
19–21	S. S. Pavonia	47 00	36 45	6 a. m	41 53	69 52	
20	S. S. City of Richmond	40 36	60 02		42 13	51 50	9 p. m., at intervals.
20	S. S. Main	38 26	71 27		40 26	59 35	
20	S. S. Saint Ronans	40 56	68 19		38 14	71 56	
20–21	S. S. Elbe	40 43	67 06		40 31	71 29	
20–22	S. S. Bassano	40 00	66 00		40 23	71 01	
20	S. S. Devonia	40 49	69 19		40 27	71 48	
20	S. S. Aurania	51 16	12 30		40 24	73 02	
20	S. S. Prydian	50 21	12 20		51 04	16 40	
20	S. S. Italy	41 20	47 37		50 21	17 50	
20	S. S. Servia	41 31	55 39		41 24	46 57	
21	S. S. Servia	41 39	53 59		41 34	55 02	
21	S. S. Elbe	40 23	71 26		41 42	53 22	
21	S. S. Saint Ronans	40 29	73 00		40 24	73 13	
21–22	S. S. Palestine	42 22	68 30		40 27	73 23	
21–22	S. S. Austrian	42 40	68 00		Boston		
22	S. S. Taormina	40 54	66 34		Boston		
22	S. S. Aurania	49 46	28 47		40 47	68 04	
22–23	S. S. De Ruyter	42 25	63 20		47 20	38 00	At intervals.
23	S. S. Worcester	41 24	63 00		41 38	66 03	
23	S. S. Amicitia	41 52	69 55		41 20	66 00	
23–24	S. S. Pavonia	42 17	61 58	6 a. m	40 48	69 24	
23–24	S. S. State of Alabama	43 15	61 20	10 a. m	Boston	p. m.,	at intervals
23–26	Brig Arcot	44 36	66 59		42 40	67 40	7 p. m.
24	S. S. Worcester	40 36	69 00		44 28	67 23	
24	S. S. Geiser	40 56	68 26		40 26	71 00	
24	S. S. Gallia	40 30	73 21		40 30	70 08	
25	S. S. Aurania	41 24	64 00		40 30	72 06	
25	S. S. Scandinavian	52 49	16 03	3.30 p. m	41 00	67 20	At intervals.
25	S. S. Gallia	40 33	67 47		52 42	18 01	
25–26	S. S. Celtic	41 44	51 26	8.50 a. m	40 33	66 11	
26	S. S. Scandinavian	52 40	18 29	4.30 a. m	41 57	48 55	11.30 p. m.
26	S. S. Ems	49 50	27 10		52 35	19 44	
26–27	S. S. Schiedam	46 25	45 18		49 48	27 35	
27	S. S. Ems	49 02	34 02		44 45	50 20	
27	S. S. Prydian	43 26	47 10		48 54	35 12	
27	S. S. Umbria	49 53	27 18		41 56	52 00	
27	S. S. Circassia	52 20	32 49		49 32	28 38	
27	S. S. Elder	49 51 / 49 53	5 48 / 8 48		52 01	34 08	
27–28	S. S. Albano	42 30	47 00		49 42 / 50 02	6 56 / 10 20	
27–28	S. S. Scandinavian	51 27	29 12		41 47	49 00	Noon.
28	S. S. Gallia	42 22	48 31		50 10	35 35	
29	S. S. Island	56 50	21 15		43 00	46 09	
30	S. S. Schiedam	41 07	67 30		56 02	25 30	
30	S. S. Istrian	45 00	46 40	7 p. m	41 00	68 10	
30	S. S. Sarnia	53 29	49 00		43 26	50 30	9.15 a. m.
					52 57	50 48	

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

The distribution of mean temperature over the United States and Canada for June, 1887, is exhibited on chart ii by the dotted isothermal lines. In the table of miscellaneous data are given the monthly mean temperatures, with the departures from the normal, for the various stations of the Signal Service, and the figures opposite the names of the geographical districts in the column for mean temperature, precipitation, and departures from the normal, show respectively the averages for the several districts. The normal for any district may be found by adding the departure to the current mean for the district when the departure is below the normal, and subtracting when above. On chart iv the departures from the normal are illustrated by lines connecting stations of normal or equal abnormal values.

Along the Atlantic and Gulf coasts, in the north Pacific coast region and northern plateau, the mean temperature for June, 1887, is below the normal; the deficiencies in these districts are very slight (generally less than 2°) except in Florida, along the immediate west Gulf coast, and over the northern plateau, where they range from 2° to 4°. Over the southern Rocky Mountain region and the northern districts from Montana, Wyoming, and Colorado eastward to New England, the mean temperatures are above the normal from 2° to 4°.

The following are some of the most marked departures from the normal temperature at Signal Service stations:

Above normal.	°	Below normal.	°
Fort Sully, Dak	6.6	Key West, Fla	4.7
Fort Apache, Ariz	4.9	Sanford, Fla	4.4
Fort Bridger, Wyo	4.2	Spokane Falls, Wash	3.8
Moorhead, Minn	4.1	Fort Assinaboine, Mont	3.7
Huron, Dak	3.9	Rio Grande City, Tex	3.6
Bismarck, Dak	3.5	Brownsville, Tex	3.2
Prescott, Ariz	3.5	Boisé City, Idaho	3.2
Deadwood, Dak	3.4	Fort Maginnis, Mont	2.7

RANGES OF TEMPERATURE.

The monthly, and the greatest and least daily, ranges of temperature, are given in the table of miscellaneous meteorological data.

The monthly ranges were greatest in the Rocky Mountain regions and upper Missouri valley, where numerous stations report from 60° to 68°, Winnemucca, Nev., and Phœnix, Ariz., reporting the maximum range, 68°. The Gulf coast stations show the least monthly ranges (generally below 30°), that at Key West, Fla., being the least, 18°, while Galveston, Tex., reports a monthly range of but 19°.

The greatest daily ranges of temperature exceeded 40° over the greater portion of the Rocky Mountain region, and at a majority of the stations occurred from the 16th to 20th. On the Pacific coast, over the central valleys, Lake region, and in the Atlantic coast districts the greatest daily ranges were generally from 20° to 36°, and occurred during the latter half of